

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previously Presented): A process for the preparation of polyisobutarylphenol-containing Mannich adducts, comprising:

- a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;
- b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde and at least one amine which has at least one secondary amino function and no primary amino function, to form a Mannich adduct having a polydispersity of from 1.1 to 3.5.

Claims 2-7 (Canceled).

Claim 8 (Previously Presented): The process as claimed in claim 76, wherein the basic alcohol/water mixture is a mixture of

- a) from 75 to 99.5% by weight of at least one C₂- to C₄-alcohol,
- b) from 0.4 to 24.4% by weight of water, and
- c) from 0.1 to 15% by weight of at least one amine which is volatile at room temperature.

Claim 9 (Previously Presented): The process as claimed in Claim 1, wherein an adduct mixture obtained includes from 0 to 20 mol% of polyisobutetylphenols from reaction step a) which are not reacted further.

Claims 10-19 (Canceled).

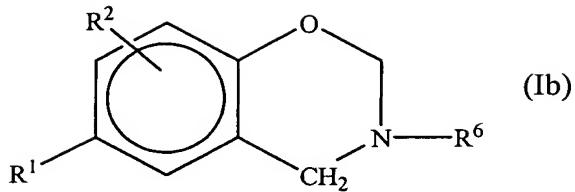
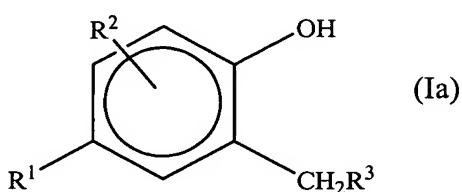
Claim 20 (Previously Presented): A process for the preparation of polyisobutarylphenol-containing Mannich adducts, comprising:

- a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst; and
- c) reacting the reaction product from a) with at least one adduct of at least one amine which has at least one secondary or primary amino function and formaldehyde, an oligomer of formaldehyde, a polymer of formaldehyde or a formaldehyde equivalent.

Claim 21 (Previously Presented): The process as claimed in claim 20, wherein the amine is at least one selected from the group consisting of 3-(dimethylamino)-n-propylamine, di[3-(dimethylamino)-n-propyl]amine, dimethylamine, diethylamine, di-n-propylamine and morpholine.

Claim 22 (Previously Presented): The process as claimed in claim 20, wherein the adduct is an aminal of formaldehyde with a secondary amine selected from the group consisting of di-C₁-C₈-alkylamines whose alkyl groups may be substituted by an N(C₁-C₄-alkyl)₂ group and cyclic amines which have 4 to 6 carbon atoms and whose cyclic structure may be interrupted by one or more of O and a N-C₁-C₄-alkyl group.

Claim 23 (Previously Presented): The process as claimed in Claim 20, wherein an adduct mixture is obtained which comprises at least 40 mol% of compounds of one or more of formula Ia and Ib,

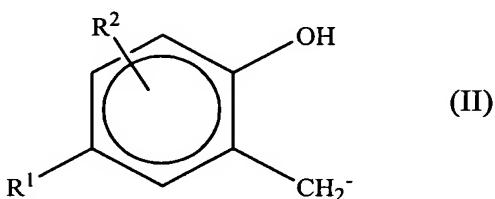


where

R¹ is a terminally bonded polyisobut enyl radical,

R² is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵, where R⁴ and R⁵ have the meanings stated below, and

R³ is NR⁴R⁵, where R⁴ and R⁵, independently of one another, are H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be interrupted and/or substituted by N and O heteroatoms, and phenol radicals of the formula II



where R¹ and R² are as defined above;

with the proviso that R⁴ and R⁵ are not simultaneously H or phenol radicals of the formula II; or R⁴ and R⁵, together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two N and O heteroatoms and may be substituted by one, two or three C₁- to C₆-alkyl radicals; and

R⁶ is a radical R⁴ or R⁵ other than H.

Claim 24 (Previously Presented): The process as claimed in Claim 20, wherein a Mannich adduct having a polydispersity of from 1.1 to 3.5 is obtained.

Claim 25 (Previously Presented): The process as claimed in Claim 20, wherein the reaction product from a) is reacted with at least one adduct of an amine and at least one

selected from the group consisting of formaldehyde, an oligomer of formaldehyde, a polymer of formaldehyde and a formaldehyde equivalent by reacting the two reactants for at least 15 minutes at above +15°C.

Claim 26 (Previously Presented): The process as claimed in Claim 20, further comprising:

fractionating the reaction mixture from c) by column chromatography over an acidic stationary phase by multistage elution with

- at least one hydrocarbon and then
- at least one basic alcohol/water mixture.

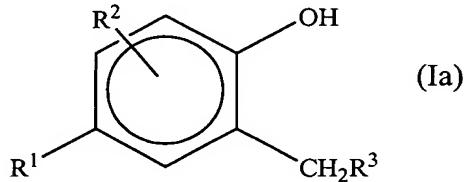
Claim 27 (Previously Presented): The process as claimed in claim 26, wherein the basic alcohol/water mixture is a mixture of

- a) from 75 to 99.5% by weight of at least one C₂- to C₄-alcohol,
- b) from 0.4 to 24.4% by weight of water, and
- c) from 0.1 to 15% by weight of at least one amine which is volatile at room temperature.

Claim 28 (Previously Presented): The process as claimed in Claim 20, wherein an adduct mixture obtained includes from 0 to 20 mol% of polyisobut enylphenols from reaction step a) which are not reacted further.

Claim 29 (Previously Presented): The process as claimed in Claim 20, wherein an adduct mixture obtained includes from 1-15 mol% of polyisobut enylphenols from a) which are not reacted further.

Claim 30 (Previously Presented): The process as claimed in Claim 1, wherein an adduct mixture is obtained which comprises at least 40 mol% of a compound of formula Ia

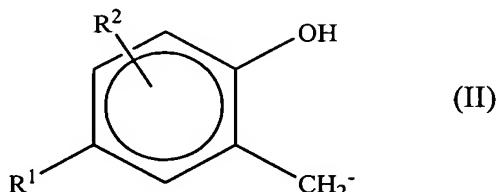


where R^1 is a terminally bonded polyisobut enyl radical,

R^2 is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵, and

R^3 is N(CH₃)₂,

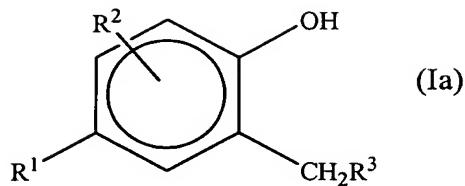
where R^4 and R^5 , independently of one another, are H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be at least one of interrupted and/or substituted by N and O heteroatoms, and phenol radicals of the formula II



where R^1 and R^2 are as defined above;

with the proviso that R^4 and R^5 are not simultaneously H or phenol radicals of the formula II; or R^4 and R^5 , together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two N and O heteroatoms and may be substituted by one, two or three C₁- to C₆-alkyl radicals.

Claim 31 (Previously Presented): The process as claimed in Claim 1, wherein an adduct mixture is obtained which comprises at least 40 mol% of a compound of formula Ia

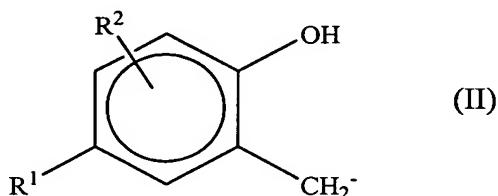


where R¹ is a terminally bonded polyisobutenyl radical,

R² is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵,

R³ is NR¹⁴R¹⁵,

where R⁴ and R⁵, independently of one another, are H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be at least one of interrupted and/or substituted by N and O heteroatoms, and phenol radicals of the formula II

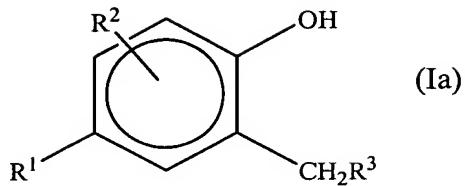


where R¹ and R² are as defined above;

with the proviso that R⁴ and R⁵ are not simultaneously H or phenol radicals of the formula II; or R⁴ and R⁵, together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two N and O heteroatoms and may be substituted by one, two or three C₁- to C₆-alkyl radicals, and

R¹⁴ and R¹⁵ are independently, butyl groups selected from the group consisting of n-butyl, isobutyl, sec-butyl, and tert-butyl.

Claim 32 (Previously Presented): The process as claimed in Claim 23, wherein an adduct mixture is obtained which comprises at least 40 mol% of a compound of formula Ia



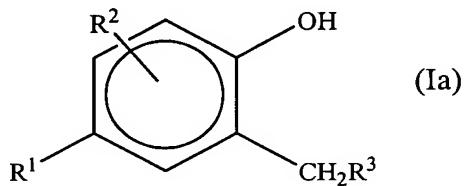
where R^1 is a terminally bonded polyisobut enyl radical,

R^2 is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or

CH₂NR⁴R⁵, and

R^3 is N(CH₃)₂.

Claim 33 (Currently Amended): The process as claimed in Claim 23, wherein an adduct mixture is obtained which comprises at least 40 mol% of a compound of formula Ia



where R^1 is a terminally bonded polyisobut enyl radical,

R^2 is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or

CH₂NR⁴R⁵,

R^3 is NR¹⁴R¹⁵ where R¹⁴ and R¹⁵ are independently, butyl groups selected from the group consisting of N-butyl, n-butyl, isobutyl, sec-butyl, and tert-butyl.

Claims 34-46 (Canceled).

Claim 47 (Previously Presented): The Mannich adduct as claimed in Claim 84, wherein the amine is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-

sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claim 48 (Previously Presented): The process as claimed in Claim 20, wherein the polyisobutene has a number average molecular weight of from 500 to 1500.

Claim 49 (Previously Presented): The process as claimed in Claim 20, wherein the phenol is at least one of an unsubstituted phenol and an alkyl substituted phenol.

Claim 50 (Previously Presented): The process as claimed in Claim 20, wherein the phenol is 2-methyl phenol.

Claim 51 (Canceled).

Claim 52 (Previously Presented): The process as claimed in Claim 20, wherein the amine is a secondary amine of formula HNR^4R^5 , wherein R^4 and R^5 are independently a C_1 - C_{20} alkyl radical which may be at least one of interrupted and substituted by at least one of N and O, wherein N and O may be substituted.

Claim 53 (Previously Presented): The process as claimed in Claim 20, wherein at least one of the C_1 - C_{20} alkyl radicals is at least one of interrupted and substituted by at least one of N and O which is substituted with at least one selected from the group consisting of H, C_1 - C_6 -alkyl, aryl and hetaryl.

Claim 54 (Previously Presented): The process as claimed in Claim 20, wherein the amine is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claims 55-68 (Canceled).

Claim 69 (Previously Presented): The lubricant composition as claimed in Claim 84, wherein the polyisobutene of the adduct has a number average molecular weight of from 500 to 1500.

Claim 70 (Previously Presented): The lubricant composition as claimed in Claim 84, wherein the phenol of the adduct is at least one of an unsubstituted phenol and an alkyl substituted phenol.

Claim 71 (Previously Presented): The lubricant composition as claimed in Claim 84, wherein the phenol of the adduct is 2-methyl phenol.

Claim 72 (Canceled).

Claim 73 (Previously Presented): The lubricant composition as claimed in Claim 84, wherein the amine of the adduct is a secondary amine of formula HNR^4R^5 , wherein R^4 and R^5 are independently a $\text{C}_1\text{-C}_{20}$ alkyl radical which may be at least one of interrupted and substituted by at least one of N and O, wherein N and O may be substituted.

Claim 74 (Previously Presented): The lubricant composition as claimed in Claim 73, wherein at least one of the C₁-C₂₀ alkyl radicals is at least one of interrupted and substituted by at least one of N and O which is substituted with at least one selected from the group consisting of H, C₁-C₆-alkyl, an aryl group and a hetaryl group.

Claim 75 (Previously Presented): The lubricant composition as claimed in Claim 84, wherein the amine of the adduct is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claim 76 (Previously Presented): A process for the preparation of polyisobutlenylphenol-containing Mannich adducts, comprising:

a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;

b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde and

at least one amine which has at least one secondary amino function and no primary amino function, and

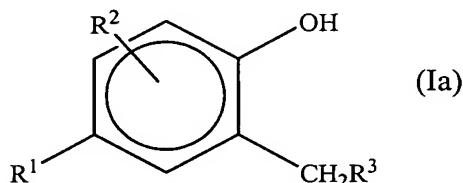
fractionating the reaction mixture from b) by column chromatography over an acidic stationary phase by multistage elution with

- at least one hydrocarbon and then
- at least one basic alcohol/water mixture.

Claim 77 (Currently Amended): The process as claimed in Claim 76, wherein the phenol is 2-methyl phenol and the amine is n-butylamine di-n-butylamine.

Claim 78 (Previously Presented): A process for the preparation of polyisobutetylphenol-containing Mannich adducts, comprising:

- a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;
- b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde, and at least one amine which has at least one secondary amino function and no primary amino function, to form an adduct mixture comprising at least 40 mol% of a compound of formula Ia



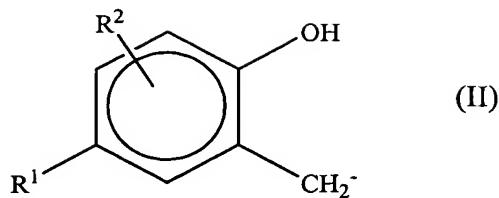
where

R¹ is a terminally bonded polyisobutetyl radical,

R² is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵, where R⁴ and R⁵ have the meanings stated below, and

R³ is N(CH₃)₂,

where R⁴ and R⁵, independently of one another, are H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be at least one of interrupted and/or substituted by N and O heteroatoms, and phenol radicals of the formula II



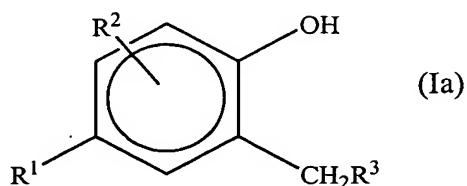
where R^1 and R^2 are as defined above;

with the proviso that R^4 and R^5 are not simultaneously H or phenol radicals of the formula II; or R^4 and R^5 , together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two N and O heteroatoms and may be substituted by one, two or three C_1 - to C_6 -alkyl radicals.

Claim 79 (Currently Amended): The process as claimed in Claim 78, wherein the phenol is 2-methylphenol and the amine is n-butylamine di-n-butylamine.

Claim 80 (Previously Presented): A process for the preparation of polyisobutenylophenol-containing Mannich adducts, comprising:

- a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;
- b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde, and at least one amine which has at least one secondary amino function and no primary amino function, to form an adduct mixture comprising at least 40 mol% of a compound of formula Ia



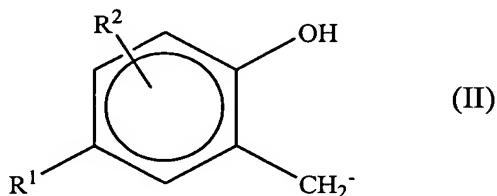
where

R¹ is a terminally bonded polyisobut enyl radical,

R² is H, C₁- to C₂₀-alkyl, C₁- to C₂₀-alkoxy, hydroxyl, a polyalkylenyl radical or CH₂NR⁴R⁵, where R⁴ and R⁵ have the meanings stated below, and

R³ is N(R¹⁴R¹⁵), where R¹⁴ and R¹⁵ are, independently butyl groups selected from the group consisting of n-butyl, isobutyl, sec-butyl, and tert-butyl,

where R⁴ and R⁵, independently of one another, are H, C₁- to C₂₀-alkyl, C₃- to C₈-cycloalkyl and C₁- to C₂₀-alkoxy radicals which may be interrupted and/or substituted by N and O heteroatoms, and phenol radicals of the formula II



where R¹ and R² are as defined above;

with the proviso that R⁴ and R⁵ are not simultaneously H or phenol radicals of the formula II; or R⁴ and R⁵, together with the N atom to which they are bonded, form a 5-, 6- or 7-membered cyclic structure which has one or two N and O heteroatoms and may be substituted by one, two or three C₁- to C₆-alkyl radicals.

Claim 81 (Currently Amended): The process as claimed in Claim 80, wherein the phenol is 2-methylphenol and the amine is n-butylamine di-n-butylamine.

Claim 82 (Previously Presented): A process for the preparation of polyisobut enylphenol-containing Mannich adducts, comprising:

a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;

b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde, and at least one amine which has at least one secondary amino function and no primary amino function,

wherein the amine is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claim 83 (Previously Presented): The process as claimed in Claim 82, wherein the phenol is 2-methylphenol.

Claim 84 (Previously Presented): A lubricant composition containing a main amount of at least one of a liquid lubricant, a semisolid lubricant, and a solid lubricant, and at least one Mannich adduct obtained by

a) alkylation of a phenol with polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;

b) reaction of the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde and at least one amine which has at least one secondary amino function and no primary amino function.

Claim 85 (Currently Amended): The lubricant as claimed in Claim 84, wherein the phenol is 2-methylphenol and the amine is ~~n-butylamine~~ di-n-butylamine.

Claim 86 (Previously Presented): A process for the preparation of polyisobutenyphenol-containing Mannich adducts, comprising:

a) alkylating a phenol with at least one polyisobutene having more than 70 mol % of vinylidene double bonds and a number average molecular weight of from 300 to 3000 at below about 50°C in the presence of an alkylation catalyst;

b) reacting the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde, and at least one amine which has at least one secondary amino function and no primary amino function,

wherein the amine is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claim 87 (Previously Presented): The process as claimed in Claim 86, wherein the phenol is 2-methylphenol.

Claim 88 (Currently Amended): A fuel composition containing a main amount of a liquid hydrocarbon fuel and an amount of at least one Mannich adduct obtained by

a) alkylation of a phenol with polyisobutene having more than 70 mol% of vinylidene double bonds and a number average molecular weight of from 300 to 3000 and below about 50°C in the presence of an alkylation catalyst;

b) reaction of the reaction product from a) with formaldehyde, an oligomer or a polymer of formaldehyde, and at least one amine which has at least one secondary amino function and no primary amino function,

wherein the amine of the adduct is at least one selected from the group consisting of dimethylamine, diethylamine, methylethylamine, di-n-propylamine, diisopropylamine, diisobutylamine, di-sec-butylamine, di-tert-butylamine, dipentylamine, dihexylamine, diecyclopentylamine, dicyclopentylamine, dicyclohexylamine, and diphenylamine.

Claim 89 (Previously Presented): The fuel composition as claimed in Claim 88, wherein the phenol is 2-methylphenol.

DISCUSSION OF THE AMENDMENT

Claims 1, 8-9, 20-33, 47-50, 52-54, 69-71, and 73-89 are active in the present application. Claims 2-7, 10-19, 34-46, 51, 55-68 and 72 are canceled claims. Claims 77, 79, 81 and 85 are amended to state that the amine is di-n-butylamine. Support for the amendment is found in the specification on page 9, lines 19-26.

No new matter is added.